

What is claimed is:

1. A method of scheduling data transmission from a source to a plurality of destinations comprising:
performing weighted scheduling of polling to destinations; and
transmitting data to destinations with successful polls using a shared transmit data buffer.
- 5 2. The method according to claim 1 further comprising:
using weighted interleaved round robin scheduling in conjunction with a weight spreader function to
schedule polling.
3. The method according to claim 1 wherein said scheduling maintains fairness and reduces head-of-
line blocking.
- 10 4. The method according to claim 1 further comprising:
assigning a weight value to help ensure that polled destinations have a high probability of being able to
accept data.
5. The method according to claim 1 further comprising:
only polling destinations for which data is pending for transmission.
- 15 6. The method according to claim 1 further comprising:
assigning each destination a logarithmic weight value defining the relative rate at which the destination
will be eligible to be polled.
7. The method according to claim 6 wherein a destination's relative weight is equal to two raised to
the maximum logarithmic weight minus said assigned logarithmic weight.
- 20 8. The method according to claim 6 further comprising:
assigning each destination a sequence value, with destination of the same weights being assigned to a
roughly evenly distributed sequence values so that said sequence values evenly distribute polling of
destinations of the same relative weight.
9. The method according to claim 1 further comprising:
25 using a scheduler to cycle through a numerical sequence;
wherein a destination is eligible for polling if the destination has data queued and if a number n of
LSBs of the destination sequence match the n LSBs of the master sequence number, where n is the
destination's logarithmic weight value or where n equals zero.
10. The method according to claim 1 wherein said scheduling does not require a particular assignment
30 of destination identifications because relative weights are assigned independently of a destination
identification.

11. The method according to claim 1 wherein said scheduling does not require a particular assignment of destination identifications because sequence numbers are assigned independently of a destination identification.
12. The method according to claim 1 further comprising:
- 5 receiving data to a plurality of destinations from a wide area network;
holding said data in queues in a queue controller; and
for destinations with successful polls, transmitting data from said queues to a transmit data FIFO.
13. The method according to claim 12 further comprising:
- 10 signaling from said queue controller to a polling scheduler an identification for destinations with pending data.
14. A method of detecting a last bit in a bit vector comprising:
- determining a highest active bit position in said bit vector;
determining a lowest active bit position in said bit vector;
comparing said highest active bit position and said lowest active bit position and when equal
- 15 determining that said bit vector contains just one active bit.
15. The method according to claim 14 wherein said lowest and highest bit positions are encoded as n-bit values, where 2^n indicates the width of said bit vector.
16. A method of cyclically outputting values encoded by a bit vector comprising:
- determining a lowest active bit position value in said bit vector using a priority encoder;
- 20 outputting said lowest active bit position value;
feeding back said lowest active bit position value and said bit vector to a reset bit module for removing a bit at said lowest active bit position value; and
repeating said determining, outputting, and feeding back steps on a bit vector with said lowest active bit position reset until a terminal condition is reached.
- 25 17. The method according to claim 16 wherein said terminal condition is determined by:
determining a highest active bit position in said bit vector; and
comparing said lowest active bit position and said highest active bit position and when equal signaling that a last bit has been reached.
18. A traffic management device comprising:
- 30 a master sequence number that increments when a port selection cycle is completed;
a scheduler that reads polling parameters corresponding to port ids and selects ports for polling based on said parameters;
a poller for issuing polls to ports; and
a queue controller for emitting data units to ports that respond affirmatively to said polls.

19. The device according to claim 18 wherein said parameters include a port active parameter and wherein ports are not selected if said port active parameters indicates there is no data to send to said port.
20. The device according to claim 18 wherein said parameters include a port sequence parameter and wherein ports are not selected if said port sequence parameter does not match a specified number of bits of said master sequence number.
21. The device according to claim 20 wherein said specified number is determined by a port weight parameter.
22. The device according to claim 18 further comprising:
a poll request FIFO for holding port ids of ports selected for polling.
23. The device according to claim 18 further comprising:
a transmit data FIFO for holding data to be transmitted to ports with successful polls.
24. The device according to claim 18 further comprising:
a queue controller with per port FIFOs for holding data yet to be scheduled for transmission to ports with successful polls.
25. A communication device comprising:
an ATM up-link module providing centralized traffic management for a plurality of access line cards;
a plurality of access line modules for connecting to a plurality of destinations;
an engine for per port flow control and cell emission scheduling of downstream traffic; and
a polling sequencer comprising:
a sequencer that scans a sequencing table identifying loop ports which are eligible for polling;
a Poll Request FIFO wherein portIDs of eligible loop ports are placed; and
a poller that uses said portIDs from said Poll Request FIFO to poll ports.
26. The device according to claim 25 further comprising:
wherein said polling requests asserted transmit packet available signals indicating ports to which cells may be transmitted
27. A computer readable medium containing computer interpretable instructions describing a circuit layout for an integrated circuit that, when constructed according to said descriptions, will configure a circuit to embody the apparatus described in claim 18.
28. A communications system comprising:
a plurality of loop port modems for exchanging data with a plurality of subscribers;
a traffic management device for handling flow control and traffic management between said plurality of subscribers and a wide-area-network;

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a loop port scheduler that scans sequencing parameters, said parameters indicating loop ports that are eligible for polling and identifies port ids of ports eligible for polling;
a poller that uses said port ids to poll ports to detect ports ready to accept data; and
a wide area network interface accepting data from a wide area network into and transmitting said data to ports ready to accept data.

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